What is claimed is

1. A method for controlling an actuator, said method comprising manipulating the forced resonant frequency of the plunger of said actuator.

Sub B1 cont.

2. A method for controlling an actuator, said method comprising maintaining the forced resonant frequency of the plunger of said actuator at a substantially constant value over a fractional actuation range.

3. A method for controlling an actuator, said method comprising maintaining the forced resonant frequency of the plunger of said actuator substantially constant at a maximum maintainable value over a fractional actuation range.

4. A method for controlling an actuator, said method comprising maintaining the forced resonant frequency of the plunger of said actuator substantially at the value of the natural mechanical resonant frequency, said forced resonant frequency being maintained at the value of said natural mechanical resonant frequency over the actuation range.

5. A method for controlling an actuator over an actuation range, said method comprising
   a. employing an actuating impetus that is non-linear with displacement
   b. using displacement as the only measured feedback signal
   c. keeping the forced resonant frequency of the plunger substantially constant under actuation.

6. A method as in claim 5, wherein said plunger is controlled by a software control algorithm.

7. A method as in claim 5, wherein said forced resonant frequency is kept substantially at a constant value over a fractional actuation range, said constant value being substantially equal to the maximum attainable oscillation frequency of said plunger under actuation over said fractional range.

Sub B' cont.

8. A method as in claim 5 wherein said constant value of said forced resonant frequency is substantially equal to the natural mechanical resonant frequency of said plunger.

9. A method for controlling an electrostatic actuator over an actuation range, said method comprising

   a. employing an actuating impetus that is non-linear with displacement
   b. using displacement as the only measured feedback signal
   c. controlling the plunger via a software control algorithm
   d. imposing a constant actuation gradient on said actuator as long as the desired actuating signal to said actuator is constant.

10. A method as in claim 9, wherein the forced resonant frequency is kept at a substantially constant value over a fractional actuation range, said constant value being substantially equal to the maximum attainable oscillation frequency of said plunger under actuation over said fractional actuation range.

Sub a' cont.

11. A method as in claim 9 wherein said forced resonant frequency is substantially equal to the natural mechanical resonant frequency of said plunger.

12. A method for controlling an actuator of which, the actuating impetus is non-linear with the displacement of the plunger of said actuator, said method comprising
    a. controlling separately
        i. the displacement of the plunger and
        ii. the slope of the applied actuating signal with respect to the displacement and
    b. controlling concurrently
        i. the displacement of the plunger and
        ii. the slope of the applied actuating signal with respect to the displacement.

a

13. A method for controlling an actuator, said actuator comprising a plunger with a resonant frequency that varies with the displacement of said plunger, said method comprising
    a. controlling separately
        i. the displacement of the plunger and
        ii. the slope of the applied actuating signal with respect to the displacement and
    b. controlling concurrently
        i. the displacement of the plunger and

ii. the slope of the applied actuating signal with respect to the displacement.

14. A method for controlling an actuator over an actuation range, said method comprising

Sub a1 concl'd.

a. actuation of the plunger of said actuator using one of electromagnetic and electrostatic force to provide an actuating force and
b. measurement of only the plunger displacement as feedback signal and
c. obtaining a first calibration relationship of plunger displacement as a function of activating impetus and
d. obtaining a second calibration relationship of the actuation gradient as a function of plunger displacement, said actuation gradient being chosen to impose a constant forced resonant frequency on said plunger at each displacement,
e. keeping said forced resonant frequency of said plunger substantially constant over said actuation range.

15. A method as in claim 14 wherein at least one of said first calibration relationship and said second calibration relationship comprises a one-dimensional look-up table.

16. A method as in any of the above claims wherein said actuator is a microelectromechanical actuator.

Sub a2 cont.

17. A method as in claim 2, wherein said fractional actuation range includes at least a portion of the snap-down region of said actuator.

Sub a2 amd'd.

18. A method as in claim 3, wherein said fractional actuation range includes at least a portion of the snap-down region of said actuator.

19. A method as in claim 4, wherein said actuation range includes at least a portion of the snap-down region of said actuator.

20. A method as in claim 5, wherein said actuation range includes at least a portion of the snap-down region of said actuator.

21. A method as in claim 9, wherein said actuation range includes at least a portion of the snap-down region of said actuator.

22. A method as in claim 14, wherein said actuation range includes at least a portion of the snap-down region of said actuator.

23. A method as in claim 16, wherein the range of actuation includes at least a portion of the snap-down region of said actuator.

add a3